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# VALIDATION DRAFT

## Food and Nutrition Sciences

### Curriculum Guideline for the Senior Division

*August 1988*

**Draft document for discussion purposes only**

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Mowat Block
Queen's Park
Toronto, Ontario
M7A 1L2

(416) 965-2666

16e étage
Édifice Mowat
Queen's Park
Toronto (Ontario)
M7A 1L2

À L'ATTENTION DES : Directeurs et directrices de l'éducation

DE LA PART DE : Sheila Roy, directrice
Centre de l'enseignement secondaire et de l'éducation des adultes

DATE : Le 29 août, 1988

OBJET : Examen critique du programme-cadre
La Nutrition

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Le ministère de l'Éducation prépare un programme-cadre pour les deux cours au cycle supérieur portant sur La Nutrition. Nous joignons à la présente une ébauche de la version française afin de vous permettre de l'examiner et de nous faire part de votre avis.

L'élaboration de ce cours a été faite par un comité formé d'éducateurs chargés de cours dans ce domaine ainsi que de représentants du monde des affaires et des collèges communautaires.

Nous invitons les éducateurs à examiner cette ébauche et à nous communiquer par écrit leurs réactions et leurs suggestions en vue de l'améliorer. Le processus d'examen critique durera jusqu'au 29 décembre, 1988.

Nous demandons à chaque conseil scolaire de bien vouloir soumettre un seul rapport d'examen critique résumant les suggestions des enseignants et des administrateurs du conseil scolaire.

Nous vous invitons à photocopier cette ébauche, en partie ou en totalité, et à en donner des

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DRAFT

# Curriculum Guideline

# Food and Nutrition Sciences
## Senior Division

Part A and Part B

# PREFACE

This document supersedes and replaces Dietary Supervisors, RP-52. It reflects the changing developments in food and nutrition, as well as the effects of technological developments in the food industry. It is also consistent with the policies outlined in the circular Ontario Schools, Intermediate and Senior Divisions, 1984 (OSIS).

Food and Nutrition Sciences, 1988, provides the subject guidelines and authorization for two Senior Division courses at the basic, general, and/or advanced levels of difficulty. For credit purposes, these courses are to be designated as food and nutrition sciences, under the general studies category of subjects. Courses developed from this guideline will be classified as senior social science credits.

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## Food and Nutrition Sciences

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# PART A

# PLANNING AND DEVELOPING FOOD AND NUTRITION SCIENCES PROGRAMS

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# 1. PROGRAM POLICIES AND SUGGESTIONS

## 1.1 Introduction

Individuals require knowledge about nutrition and food in order to enhance their well-being by making appropriate choices about what to eat. However, food is more than just an edible substance that sustains life. When making choices about what to eat, people combine their knowledge about nutrition and the wise use of food with their value systems, their lifestyles, and a variety of personal, economic, and cultural influences; their thoughts about and responses to food and nutrition are affected by their ethnocultural experiences and their emotional and attitudinal orientations.

For these reasons, the study of food and nutrition is best done in a multifaceted way. The integration of various principles, theories, facts, and attitudes based on culture, politics, religion, technology, science, sociology, geography, and economics can help students to understand themselves, their food patterns, and the food choices available to them. Students should also be aware of the broad range of nutrition issues that affect food resources in their own dietary patterns and in their emerging awareness.

In order to encourage students to make healthy, nutritional choices and to understand the complex psychological and social dimensions of food, the courses developed from this guideline must provide students with opportunities to examine critically, analyse, compare, and evaluate the various options that are available to them. These courses must also focus on the decision-making skills involved in making food choices and provide students with (a) a framework within which they may make appropriate dietary choices for the maintenance of their health and well-being, (b) experience with food and (c) experimentation to test the scientific principles related to food.

Courses developed from this guideline also will be able to provide students with information about and insight into what is involved in many of the careers available related to food and nutrition sciences. Also, advanced level courses developed from this guideline are to provide a preparatory background for proceeding to post-secondary studies in food sciences, nutrition, and related areas.

## 1.2 The Goals of Education

The Ministry of Education in Ontario strives to provide in the schools of the province equal opportunity for all. In its contribution to programs, personnel, facilities, and finances, the ministry has the overall purpose of helping individual intellectual, emotional, social, cultural, and moral development. The goals of education, therefore, consist of helping each student to:

1. develop a responsiveness to the dynamic processes of learning;

2. develop resourcefulness, adaptability, and creativity in learning and living;

3. acquire the basic knowledge and skills needed to comprehend and express ideas through words, numbers, and other symbols;

4. develop physical fitness and good health;

5. gain satisfaction from participating and from sharing the participation of others in various forms of artistic expression;

6. develop a feeling of self-worth;

7. develop an understanding of the role of the individual within the family and the role of the family within society;

8. acquire skills that contribute to self-reliance in solving practical problems in everyday life;

9. develop a sense of personal responsibility in society at the local, national, and international levels;

10. develop esteem for the customs, cultures, and beliefs of a wide variety of societal groups;

11. acquire skills and attitudes that will lead to satisfaction and productivity in the world of work;

12. develop respect for the environment and a commitment to the wise use of resources;

13. develop values related to personal, ethnical, or religious beliefs and to the common welfare of society.

The preceding goals are not arranged in any hierarchical order, nor are they discrete categories from which a checklist should be made. The integrated nature of learning and the complex pattern of human development preclude such a sequential or fragmented approach. The translation of the goals into curriculum objectives will result in sequences of learning appropriate to the particular levels and stages of development of the students for whom programs are being planned.

### 1.3 Aims of the Program

It is intended that the aims of the food and nutrition sciences program be consistent with and relate to the pertinent goals of education outlined above.

The food and nutrition sciences program shall provide students with opportunities to develop:

- an understanding of the social, cultural, political, religious, and economic aspects of food and their influence on individuals and society;
- an understanding of how values, preferences, and beliefs influence decision making and problem solving related to food and nutrition;
- an understanding of the relationship among one's lifestyle, food choices, and nutritional well-being;
- an understanding of the composition and function of food and the criteria for assessing the validity of information on nutrition;
- an understanding of the impact of technological change on food and nutrition;

- an ability to make decisions about life choices related to food and nutrition;
- an ability to think critically about and to analyze personal and societal nutrition issues.

## 1.4 THE FOOD AND NUTRITION SCIENCES PROGRAM: POLICIES

This guideline provides the policy from which school boards shall plan, implement, and review a food and nutrition sciences program. When this program is offered in schools it must satisfy the following policy requirements:

- This guideline provides for two Senior Division courses in Food and Nutrition Sciences at the basic, general, and advanced levels of difficulty.

- A maximum of one single-credit course may be offered at each of the basic, general, and advanced levels of difficulty from each course outlined in Part B of this guideline. Up to one credit may be obtained by a student on any one course. In those instances in which courses offered are delivered in a co-operative education mode within the requirements outlined in OSIS (section 5.11), a maximum of three credits may be allotted for such a course.

- In order to preserve the cohesiveness of the program, no portion of this guideline may be offered for fractional credit. (Refer to OSIS, section 4.5.)

- Any credit gained from Senior Division courses developed from this guideline can be used as the Senior social science credit students require in order to be eligible for an Ontario Secondary School Diploma (OSSD).

- No prerequisites are required for food and nutrition sciences courses.

## Organization

The food and nutrition program is organized in two senior division courses in the following manner:

Food and Nutrition Sciences I

Food and Nutrition Sciences II

## 2. CONSIDERATIONS IN DEVELOPING PROGRAMS

### 2.1 Needs of Adolescent Students

During their years in the Senior Division students are maturing towards young adulthood. The tasks of critical importance at this stage of the life cycle include: adjustment to the approaching independence from parents and other authority figures; establishment of effective social and working relationships with others; preparation for a possible vocation; and the further development of a system of values and a sense of identity. Courses in food and nutrition sciences should recognize these tasks and the needs and interests of students in Senior Division by encouraging the development of resourcefulness, creativity, independence, and self-exploration.

Students in the Senior Division are increasingly aware of the variety of lifestyles in our multicultural society and of the plethora of often-confusing nutrition information and food-related issues. This stage of their development is an opportune time for them to learn to appreciate the complex interaction of factors that affect their own day-to-day food choices and their attitudes towards personal well-being. They are ready to examine the values that underlie personal and societal decisions related to food and nutrition as well as nutrition-related issues (e.g., growth-spurt needs; the need to develop and improve body structure and function, the use of fitness activities, sport, dance, theatre, and other activities to meet the physically demanding needs of the adolescent years).

Students will also be able to experience in real or simulated ways aspects of careers or jobs related to the topics in food and nutrition sciences.

## 2.2 Sex Equity

The equal availability of all courses in schools to both female and male students is a requirement of the Ministry of Education. This policy has special significance in food and nutrition sciences. The guideline provides for the development of a program which has equal applicability and appeal to female and male students. It is intended that the learning environment, as well as the materials and methods used, be exemplary models of sex equity, avoiding both implicit and explicit sex-role stereotyping. Teachers should be sensitive to the needs of both sexes when preparing courses of study. Invitations to females and males with careers in food and nutrition to speak to students is a way of presenting information as well as a non-stereotypical message.

## 2.3 Exceptional Students

Exceptional students should participate in food and nutrition sciences courses at levels congruent with their interests and aptitudes. Teachers should be prepared to make appropriate program modifications in terms of teaching strategies, pacing, assessment and evaluation, and the use of facilities and equipment for students with a variety of exceptionalities.

Exceptional students are identified through an identification, placement, and review committee (IPRC).

Procedures for their identification are outlined in the Education Act, and Regulations. Under this legislation, exceptionalities are defined as behavioral, communicational, physical, intellectual (including gifted), and multiple.

In addition to this identification process, special education legislation requires that appropriate courses be developed or modified to accommodate the exceptional student's individual needs. The modifications required in food and nutrition science may be quite extensive and may require the use of specially designed space and resources for severely handicapped students. Special arrangements for adequate supervision may be required.

As for all students, the programs offered to exceptional students must be based on and modified by continuous assessment and evaluation. The use of flexible assessment techniques, such as observation and teacher-student interviews, should be used to supplement the more formal types of assessment so that a more personal and complete picture of the student's progress may be obtained. The assignment may also need to be different. For example, oral presentations could be used instead of written assignments, and microcomputers could be used by students who cannot talk and/or write.

In preparing to teach exceptional students, teachers should acquire information about the students that may be available from resource staff who know the students, through observation and personal contact with each student, and through ongoing consultation with parents.

As teachers become acquainted with their students, they will adopt strategies and approaches that meet the needs of exceptional students. The following suggestions are intended to give teachers a range of ideas.

Students with behavioral exceptionalities

- Special care should be taken to ensure that instructions are expressed clearly and concisely.
- Additional supervision should be provided around potentially dangerous tools and equipment.
- Tasks should be assigned at each student's level of ability to maximize the opportunities for success and satisfaction.
- Routines should be consistent and carried out with minimal disruption.

- Students should know their specific tasks at the outset, and a schedule of activities should be maintained.

- A "quiet area" should be provided for students who are temporarily unable to cope.

- Positive reinforcement should be used for acceptable behaviour, and the consequences of misbehaviour should be handled consistently, ensuring that the students involved understand the cause-and-effect relationship.

Students with communication exceptionalities

- New vocabulary should be taught in context; objects used in class activities should be labelled.

- Students should be provided with visual as well as auditory clues and/or reinforcement.

- Teachers should enunciate clearly and rephrase any question or statement if students do not understand.

- Classroom distractions should be reduced to a minimum.

- Alternative modes for communication should be used to eliminate physical barriers to self expression (e.g., microcomputers and appropriate software).

## Students with physical exceptionalities

- Extra time may be necessary for the completion of assignments. Where appropriate, the amount of writing should be reduced or perhaps eliminated and alternative methods of recording (e.g., tape recorders) utilized.

- Videotaped sessions with demonstrations for students to review.

- Additional space and modified equipment or tools might be required to accommodate a wheelchair.

- Floors should be free of obstructions and covered with non-slip materials.

- Microcomputers, Bliss boards, or other devices should be provided for students who are unable to communicate by talking or writing.

## Students with intellectual exceptionalities (other than gifted)

- Rules should be expressed simply, clearly, and consistently; teachers should use sequential instructions that are developed in logical steps.

- New skills should be demonstrated and their practice supervised, especially when activities involve the use of potentially dangerous equipment.

- Immediate feedback should be provided to students.

- Improvements of levels of performance should be expected, encouraged, and applauded.

- Functional language skills should be reinforced in each lesson wherever possible. Print materials for students should be chosen to suit students' reading levels.

- The development of individual skills should be stressed and competition avoided.

Students with intellectual exceptionalities (Gifted)

- Creativity, divergent thinking, and skills of analysis, synthesis, and evaluation should be encouraged.

- Students should be encouraged to develop organizational and leadership skills through the use of class presentations making use of wide variety of media techniques and new technologies.

- Individual projects requiring independent study should be emphasized. High standards that cause students to extend themselves should be encouraged.

- Use should be made of facilities, personnel, and equipment outside of the school. The expertise of people in the community should be drawn on to enhance learning activities.

The following Ministry of Education publications contain suggestions on teaching strategies for pupils with various exceptionalities:

- Behaviour, 1986.
- Gifted Learner, 1984
- Handbook for Teachers of Students With Learning Disabilities, 1986
- Vision, 1987.

## 2.4 Adult Students

Adults enrolled in regular school programs may be grouped in classes composed exclusively of adults or integrated with regular school-age students. Relatively small adjustments in planning may provide substantial benefits for adult learners as well as enrich the experiences of adolescents.

In designing courses of study, teachers may adapt content and use teaching strategies to meet the needs of adult learners. The following are some characteristics of adult learners:

- Most consider formal learning as subsidiary to their primary role, (e.g., mother, father, citizen). Their enrolment in formal learning programs is most often voluntary and usually on a part-time basis.

- They tend to have a broad range of experience, come from a variety of backgrounds, and have different interests, attitudes, levels of formal education, occupations, ages, and family responsibilities.

- They are motivated to undertake formal learning for a definite purpose. They see the need for programs that can help them in their present careers or they are at a stage in their life cycle or job cycle that requires a new direction.

- Their individual learning styles are usually more pronounced than those of school-age children; therefore, adults tend to have a preferred mode of learning that has been defined through their past learning experiences.

- Adult students are very pragmatic and therefore prefer learning experiences that are problem-oriented.

Food and nutrition sciences courses should provide an opportunity for interaction between adult and adolescent students in which both can explain their experiences and points of view. Teachers should take advantage of the characteristics listed above and modify teaching and learning techniques to accommodate adults within the program. Although the following suggested techniques are suitable for most classroom situations, they are especially critical for programs that include adult learners:

- Learning objectives should be reasonable, rational, relevant, and purposeful.

- The level of language used in instructing adult learners should reflect their level of maturity.

- The experiences of adult learners should be utilized in the classroom.

- Small-group discussions and individualized learning methods should be provided.

- Self-direction and autonomous learning should be encouraged by providing learners with increased responsibility for task analysis, course content, and evaluation methods.

- Courses should be provided at appropriate levels of difficulty to accommodate the learning abilities of adults.

- A humanistic approach will provide a comfortable learning environment to the adult learner.

- Immediate feedback should be provided and regular encouragement offered in order help adult students take charge of the learning process.

- A broad range of evaluation methods, both formative and summative, should be used.

## 2.5 Race and Ethnocultural Equity

It is essential that Canadians be aware of the cultural and racial composition of our society. Teachers should be encouraged to develop courses that are consistent with the educational goals of race and ethnocultural equity and that reflect fairly and accurately the reality of Canada's multicultural and multiracial society. Food and nutrition sciences can contribute to the attainment of these objectives, since food patterns and choices often reflect cultural traditions.

In particular, the food and nutrition sciences program will assist and encourage students to:

- develop and retain a personal identity by becoming acquainted with the historical roots of the community and culture of their origin and by developing a sense of community with the past;

- understand and appreciate the points of view of ethnocultural groups other than their own. The food and nutrition sciences courses can contribute to an understanding of what it means to be Canadian by appreciating the distinct differences and emphasizing the similarities among the groups of various ethnocultural origin as represented in the class and linking these similarities to the emerging characteristics of the Canadian identity;

- acquire social skills and attitudes through an awareness of the variety of traditions and lifestyles in Canada so that they are able to work effectively and responsibly within our multicultural society.

# 3. PLANNING INSTRUCTIONAL APPROACHES

## 3.1 Levels of Difficulty

Courses developed from this guideline may be offered at the basic, general, and advanced levels of difficulty. The following are the general characteristics of the three levels of difficulty:

Basic level. Basic-level courses are to be designed to focus on the development of personal skills, social understanding, self-confidence, and preparation for the world of work. Food and nutrition sciences courses at the basic level can help to increase students' awareness of the importance of the relationship between nutrition and well-being. They can also provide students with practice in developing decision-making skills related to possible career choices in areas such as the hospitality industry, health care settings, and a variety of other food operations. The theoretical knowledge and concepts presented should be directly related to classroom experiences and should be perceived as personally useful by students.

General level. General-level courses in food and nutrition sciences should assist students to develop the attitudes, skills, knowledge, and understandings that they will require for employment, careers, or further education in programs in the colleges of applied arts and technology.

Advanced level. Advanced-level courses should focus on the development of academic skills and prepare students for entry to university or to programs at colleges of applied arts and technology. Such courses should help students to understand the theoretical principles, practical applications, and substantive content of the subject and should emphasize the development of critical thinking and creative problem-solving skills.

## 3.2 The Learning Process

Students are expected not only to acquire knowledge, attitudes, and skills in the subject matter of this program but also to become more skilled as learners, to analyze problems independently, and to derive satisfaction from both independent and co-operative accomplishments. These objectives can be accomplished by involving students in research, discussion, observation, collaboration, and application activities. It is expected that courses of study will identify intended learning processes as clearly as they do the course objectives and content and that appropriate learning experiences and assessment and evaluation activities will be used to help students achieve the objectives. Students should progress in their ability to draw valid conclusions, not only about the subject content in the cognitive, affective, and psychomotor domains, but also about the processes by which they learned.

Learning activities should also nourish students' positive self-image. This will happen when students are able to:

- express their ideas in an accepting atmosphere
- improve their skills in interpersonal relationships
- help others to fulfil themselves
- develop new skills and abilities
- accept and carry out responsibilities
- set and achieve short- and long-term goals

Students in food and nutrition sciences courses should be involved in inquiry work, independent-study activities, and the planning and completion of projects.

The practice of differentiating between the theoretical and the experiential parts of a course as though they were separate entities is inappropriate methodology. Although knowledge must be acquired before it can be applied, theory can and must be illustrated, demonstrated, and clarified through learning experiences that involve students in active and interesting ways. Both theory and practice are essential to this program and they should be treated in an integrated way.

It is recognized that substantive theory is not always easy to identify. Some recommended practices in the fields of food and nutrition may be based on untested hypotheses, common usage, personal preference, or the values of a specific group or individual. Teachers should assess the nature and authenticity of the sources of the information; nutrition, especially, has been subject to the influence of faddists, self-styled experts, and purveyors of folk myths.

A number of selected instructional approaches are described below. They are not intended to be an exhaustive list. Rather, the purpose is to highlight a few approaches appropriate to food and nutrition courses.

### Experiential Learning

Experiential learning in food and nutrition sciences is a collection of concrete experiences that will help students to test and develop their knowledge and skills. Since experiential learning is an essential part of this program, concrete learning experiences are to be included in courses of study planned from this guideline.

Simulations can also be used to help students experience a wide variety of real-life situations; generalizations can be made from such simulations through the skillful use of questions and group discussion.

### Inquiry method

The inquiry method requires students to ask and respond to specific questions that require the use of different types of thinking (e.g., critical, analytical, imaginative, conjectural). An initial experience can be used to stimulate students' questions, which should then be developed into inquiry-type questions. Such questions should be appropriate to the course content and to the aims of the food and nutrition sciences program. Students should then proceed to gather information, seek alternatives, and select one of their alternatives to answer the question.

The basic inquiry model presented in the Ministry of Education document Research Study Skills: History and Geography, (1979), provides a structured framework which will help students understand issues and strategies for specific projects.

### Small-group activities

Since much of learning involves social interaction, the use of small groups can increase the opportunities for students to learn more effectively. Many activities that involve the application of theory may also be handled best in small groups. For group work to be effective, its purpose should be clear and the students should have an understanding of the procedures to be followed.

### Co-operative learning

Co-operative learning can range from the teacher giving students a choice between two or more teacher-planned activities to the mutual planning of an activity by students and the teacher, including the objectives, learning experiences, resources, methods of assessment, and criteria for evaluation.

## Independent Study

The techniques of independent study must be learned, and students can become increasingly independent as a course progresses. For example, learning packages and computer-managed instruction may be helpful, since they allow students to work independently within a specific time frame. Although independent study may occur outside the classroom framework,[1] it may also take place within the classroom setting for one or all of the students.

In an independent-study situation the teacher must act as an adviser, providing a framework based on the goals of education and the aims of the food and nutrition science course, setting the expectations for the end result, and negotiating with students at predetermined intervals about the direction of their inquiries. Contracts between the teacher and students may be used to establish the framework and to clarify the procedures to be followed. Evaluation takes into consideration the degree to which the student's abilities in independent study have developed. It should include self- and peer evaluation in addition to evaluation by the teacher.

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[1] Ministry of Education Ontario, Ontario Schools, Intermediate and Senior Divisions (Ministry of Education, 1984), P. 30

### Individualized Learning

The individualized learning method is based on the premise that students who engage in a learning program that is of interest to them not only learn but also acquire a wider range of learning techniques. Although the teacher still plays an active role in the teaching-learning process, the teacher functions mainly as a resource person and as a catalyst for student pursuits. Students choose, plan, carry out, and evaluate their own learning experiences after they and the teacher have finalized a plan. Students have some control over one or all of the following: frequency and duration of input meetings and study sessions; choice of subject matter; sequence of units and depth of treatment objectives; decisions on readiness for assessment; criteria for evaluation; and instructional and learning methods. The more that students participate in determining the components of their learning environment, the more independent they become.

### Learning-activity packages

In a learning-activity package, the main ideas to be learned are outlined, the objectives are stated, and a variety of learning experiences are described clearly enough for students to follow the directions individually or in groups. The learning experiences are chosen to enable students to achieve the stated objectives. Such learning experiences should involve students in completing activities related to food, collecting or describing food items, conducting food experiments, and interviewing people about food. Achievement that is based on the stated objectives, as well as the evaluation of the learning-activity package itself, should be an integral part of the package.

The most relevant learning activity packages can be those designed by teachers and students. However, commercially available packages, including computer software (e.g., programs that help individuals to analyse their personal diets), can be effective when they are adapted for local use. Because learning-activity packages are prepared in advance, students should receive guidance in their use. The instructions within a well-designed package can provide flexibility in the use of time and in the choice and sequence of units.

### 3.3 Language And Learning

Since the language activities of reading, writing, speaking, and listening are the basic means of learning common to all subject areas, teachers must ensure that the four aspects of language receive appropriate emphasis and treatment in food and nutrition sciences. Teachers should create an environment that encourages students to use language to explore concepts, solve problems, and explain ideas using terminology appropriate for food and nutrition sciences. Learning activities involving writing in a variety of formats should be encouraged.

Discussion is an important part of any course; it can take place in small or large groups and can take the form of panel discussions, forums, symposiums, debates, seminars, and group problem-solving sessions. In order for discussion to be productive, students need to know why they are discussing a topic, as well as something about group dynamics and the various roles of group members. Teachers should ensure that the conclusions of any discussion group are valid or at least that the conclusions reached could lead to further investigation.

## 3.4 Computer Applications in Food and Nutrition Sciences

The computer has many advantages as a learning tool for students in food and nutrition sciences. With the expanded use of computer technology within the food industry and the workplace, as well as the increased use of microcomputers within the home, courses in food and nutrition sciences must increasingly incorporate knowledge, skills, and attitudes related to computer technology. To do this, teachers can:

- explore computer applications to classroom learning;
- encourage students to use word processing in the preparation of reports and other written work;
- have students explore ways in which computer technology is directly affecting the food industry (e.g., inventory-control software, teletext and videotext data on where and how people shop);
- encourage students to explore ways in which food and nutrition professionals use computers in their day-to-day work (e.g., computer compiled statistics).

### 3.5 Information on Career Opportunities

All students should be made aware of employment opportunities available in the field of food and nutrition. Many services professions (e.g., nursing, food-preparation and food-processing service) make use of the skills developed in food and nutrition sciences and offer career opportunities for students of this program. Students should also be provided with current information on the educational requirements for university and community college programs.

Careers and occupations related to the field of food and nutrition sciences are, for example:

- Agricultural representative
- Hotel food administrator
- Manager, food and beverage (catering & lodging)
- Sales representative, food products
- Waiter/waitress
- Food scientist
- Food technologist
- Nutritionist: researcher, consultant, public health
- Dietitian: researcher, therapeutic, administrative
- Food photographer
- Journalist
- Cook
- Baker
- Chef

Additional information on post-secondary and employment opportunities is contained within the data base of the Student Guidance Information Service (SGIS). Students and teachers may access this data base by using a microcomputer or by writing to the Ministry of Education.

Guidance counsellors and teachers should work together to:

- provide students with the information they need to make appropriate educational decisions;
- assist students in making their subject selections;
- advise students on the most appropriate training routes for meeting their needs:
- teach students job-application and interview skills;
- obtain the services of professionals in selected fields who could act as student mentors.

Students should also be encouraged to consider current trends and possible changes in future employment opportunities. Technological development, for example, is radically changing the character of many work environments with the result that traditional jobs are being redefined. A focus on careers should acknowledge that the food and nutrition field, including jobs and work skills, will continue to undergo change throughout an individual's life span.

## 3.6 Safety Considerations

A safety-conscious attitude among students and the development of student vigilance in matters of safety and accident prevention should be an objective of all courses based on this guideline.

Teachers of food and nutrition sciences have a key role to play in developing safety attitudes and work habits in students. A class program on safety introduced at the beginning of any course should focus on general procedures and rules, as well as formal school-board safety policy. All teachers should be familiar with the relevant provisions of the Education Act, the Workers' Compensation Act, the Occupational Health and Safety Act, and the Industrial Accident Prevention Act, as well as with the safety policies of the Ministry of Education and their school boards.

To ensure a safe educational or work environment, students shall adhere to safe practices and demonstrate their knowledge of the appropriate use of materials, tools, and equipment. Dull, broken, or improperly adjusted tools and equipment are a frequent cause of minor injuries. Instruction is required in the safe handling of substances commonly used in the food industry that may cause a toxic reaction in certain individuals (e.g., detergents and bleaches). Furthermore, students must understand the hazards inherent in the improper storage of foods and in improper grooming and dress, both in the classroom and the workplace.

## 4. DEVELOPING A COURSE OF STUDY AND INSTRUCTIONAL UNITS

### 4.1 Course Planning

The description of the program outlined in Part B of this guideline contains the objectives and content for each course. Within the rationale of this guideline it is permissible to develop two senior division courses leading to the Ontario Secondary School Diploma (OSSD).

### 4.2 The Course of Study

The rationale described for each course in Part B in this guideline outlines expected outcomes. The objectives and activities that make up the food and nutrition sciences program reflect the rationale outlined.

In preparing a course of study, educators must:

- assess the needs of students in relation to the particular food and nutrition sciences program being considered; and
- identify the provincial Goals of Education that will support the aims and objectives in food and nutrition sciences.

A course of study shall contain the name of the guideline on which the course is based as well as a description of the course, its level of difficulty, credit value, aims, objectives, and the subject-content headings, methodology, and strategies for assessment and evaluation. Time requirements and significant resources for each unit should be identified.

The course description should provide a statement on the program. It should identify the students for whom the course is intended (e.g., that it is an introductory course at the general level of difficulty for students in Grade 11 or 12), as well as the course's potential application to the students' work life and further education. Any additional information that would be useful to students, such as the availability of a co-operative-education component, should also be indicated.

The course aims and objectives should be specified under separate headings. These should focus on the areas of knowledge to be acquired by students and should be consistent with the objectives identified for each course in part B of this document.

The content identified in the guideline should be listed. Some guide to the time allocation for each unit of content is essential; these time allocations should be approximate, as some flexibility is necessary to meet the specific needs of different groups of students. Techniques for assessment and criteria to be used in evaluating student achievement should also be indicated.

The resources required for students and teachers involved in the course should be outlined. In food and nutrition sciences these fall into the following categories: texts and reference books, human resources, audio-visual materials, equipment and tools, supplies, computers and software, and community and classroom facilities. Specific resources should be directly related to the content and corresponding learning experiences planned for the course.

### 4.3 Instructional Units

The outline of instructional units reflects the teacher's management strategy for the course and is the responsibility of the individual teacher. The outline should identify the following:

- the characteristics of students taking the course, namely, their educational needs and attributes, their expectations for the course, their notions of issues that are important, and the skills and knowledge they believe to be necessary,
- specific learning objectives to be achieved by students,
- the teaching strategies to be employed,
- strategies for assessing, evaluating, and improving student achievement, and
- strategies for assessing and evaluating course effectiveness and for making appropriate modifications to the course where necessary.

In planning units and lessons, teachers must translate the objectives and content into precise statements that describe the skills, knowledge, and attitudes that students are expected to gain. Learning experiences must be planned to integrate the theoretical knowledge with the experiential activities. In establishing the sequence of the units, the teacher should aim for a perspective on the entire course.

Since students should always be fully aware of the nature of a course's assessment and evaluation component at the beginning of the course, the outline of the instructional units should also include plans for the assessment and evaluation of student achievement. Where the mastery of particular subject content is required, the pattern of ongoing assessment can contribute significantly to the learning process. In other cases the ability to relate subject theory to experiential activities may be assessed through students' achievement on projects, demonstrations, or assignments that involve application of the subject content. In some cases the course objectives related to the skill areas of project work may be assessed co-operatively by the teacher and the students.

## 5. EVALUATION

### 5.1 Evaluation of Student Achievement

The evaluation of student achievement is one of the most important aspects of the education process. It involves making judgement about student progress and achievement in relation to program activities. Through the process of evaluation, the educator, the student, or both of them combine data to develop a profile of student competencies, needs, and ways to address these needs. It follows, then, that the evaluation and interpretation of what the student has learned should be an integral part of the instructional component of a course.

The purposes of student evaluation are:

- to provide students and parents or guardians with information about individual progress in achieving program objectives;

- to help students identify learning difficulties and ensure that they are corrected to enhance the learning process.

- to ensure that informed decisions are made about each student's program by the student, by parents, and by teachers;

Evaluation is a process whereby the data is combined to develop a profile of student competencies and needs, and ways to address these needs. Evaluation also provides the teacher with the means of assessing his/her teaching methods, of judging the appropriateness of deciding what changes to individual or group activities are required to meet the needs of each individual in the classroom.

Although there are a variety of evaluation approaches, three general types of evaluation are suggested for teachers of food and nutrition sciences programs. These three types of evaluation are:

Diagnostic Evaluation: Diagnostic evaluation is usually done at the beginning of a course, a unit of study or when there is evidence to show that a student is experiencing difficulty. This type of evaluation should be done frequently and usually informally. The main purposes of diagnostic evaluation are to describe the level of achievement, determine the underlying reasons for the learning difficulties, and to make decisions about how best to support the learning process.

Formative Evaluation: Formative evaluation occurs throughout a program. Its main purpose is to improve instruction and learning. The data collected in formative evaluation should be analysed and used to modify and improve the quality of the program and the teaching-learning process.

Summative Evaluation: Summative evaluation is on-going throughout the course and determines the level of student achievement and program effectiveness. Summative evaluation of student achievement tends to be concerned with overall performance of students.

It is important to stress that formative and summative evaluation are best viewed along a continuum. The results of formative evaluation can form the summative evaluation process.

The teacher should assess student growth and progress through listening to, talking with, and observing students as they are in the process of producing and thinking through problems. A variety of procedures can be used to describe students' growth in knowledge and skills and development of attitudes related to food and nutrition sciences. For example, tests should be complemented by a range of other approaches such as the use of checklists, observations, journals, presentations, anecdotal records, interviews, small-group activities, reflection, peer evaluation, research projects, reports, media presentations, and computer simulations. In all instances, evaluation procedures should reflect the aims and objectives of the program. Specific criteria for evaluation of student achievement should be clear and understandable. The criteria should be communicated to students well in advance.

The following are some suggested ways of assessing student growth and progress in food and nutrition sciences.

Listening to Students: The student is the key person in the learning process. If the learning situation is to qualitatively meet their needs, then the teacher must listen to what the student says. This may be done formally and informally. Listening while students are involved in their own learning provides the teacher with the opportunity to intervene, either to support the student personally, ask critical questions that may encourage and direct progress, or suggest appropriate changes.

Structuring time to hear what students think or feel is necessary. Students who feel listened to are likely to respond more positively; teachers who listen are likely to ensure that the needs of students are being met in the teaching-learning process.

Observing: A great deal of information about student growth and progress can be obtained by watching the activities of students, interpreting that behaviour and then talking with students about the behaviour. Observation can be done informally as an integral part of the learning process. On the other hand, a more systematic approach may be required. The use of a checklist, for example, may be useful to help the teacher assess the achievement of students.

Checklists that are based upon specific criteria, and that have been systematically used in the classroom, allow teachers to make meaningful interpretations that are particularly relevant to the aims and objections of the food and nutrition sciences.

When using observation as a method of evaluating student achievement, the following suggestions should be considered.

- use specific criteria when establishing the checklist or observation schedule
- focus on a small number of criteria at any one time
- develop a strategy or plan for doing the observation
- design the observation strategy and instruments based on the development of the student
- keep informal notes that can be used to enrich the observation data
- vary the observation process by using audio/video tapes of student activities, and
- ensure that the observation findings are discussed with the students and contribute to the learning process.

Presentations: The evaluation process must be linked to presentations. Evaluation of presentations should be based upon clearly stated criteria that is given to students before the presentation. Strengths and weaknesses should be discussed and self, and peer evaluation encouraged.

Projects: In food and nutrition sciences, students should be encouraged to undertake projects and complete specific tasks. Where appropriate, imagination and creativity should be part of a finished product. When a project is assigned, the following headings may clarify the parameters of the task:

- a statement identifying the project, or choices for a project,
- a precise list of objectives that indicate the expectations for the project and for the student learning,
- a description of the process that might be used when doing the project,
- a timeline which identifies dates for an interim draft presentation of the project, consultation and the deadline for the final project, and
- the criteria that will be used for evaluating the project.

Teachers should use the following list of principles as the basis for assessment and evaluation:

- Continuous assessment of student achievement must be an integral part of the teaching-learning process. In any learning situation, students either are succeeding or are experiencing difficulty and thus are in need of redirection or additional help. Ongoing assessment identifies difficulties quickly and provides a basis for immediate action.

- Peer evaluation can have a positive effect on students if handled sensitively by students. As they gain experience in evaluating, and being evaluated by others, students will learn more, both directly and indirectly, about their achievements, abilities, interests, and aspirations.
- The form of evaluation should be appropriate to the task being evaluated, the kind of learning, and the stage of learning.
- Care must always be taken to ensure that the effect of evaluation is formative and constructive.

In summary, the evaluation of student achievement remains one of the most important aspects of the total education process. It follows that the evaluation and interpretation of what the student has learned should be an integral part of the instructional component of a program.

## 5.2 Evaluation of Food and Nutrition Science Programs

Program evaluation is integral to all phases of program development and implementation. Initially, data may be collected to determine the need for a food and nutrition sciences program or the modifications required to an existing program to meet the requirements of this guideline. In this sense, program evaluation provides data that can be used for future planning. Program evaluation has a review function; the main purpose is to determine whether the existing program is meeting the purposes for which it was planned. When revisions are needed, program evaluation identifies the direction the changes should take.

As a guide, program evaluation should examine the following aspects of the food and nutrition sciences program;

- aims and objectives
- program design
- concepts and content
- teaching strategies
- resources and facilities, and
- evaluation of student achievement.

Program evaluation should use a variety of approaches and every effort should be made to balance the approaches so that a complementary perspective is provided. One approach can be the use of an assessment instrument such as a questionnaire that can then be distributed to a variety of individuals such as students, food and nutrition sciences teachers, other teachers, principals, supervisory officers, trustees, parents, industry personnel and other members of the community. In order to keep the program evaluation manageable, it may be necessary to use appropriate research procedures such as matrix sampling. Complementary approaches such as interviews, document analysis and situational studies are important ways of getting additional data that will enrich the survey findings. In this manner, a more meaningful picture of the value and worth of the food and nutrition sciences program can be obtained.

## 6. ORGANIZATIONAL ALTERNATIVES

### 6.1 School-and Community-Related Packages

The term school-related package identifies a set of courses planned by a school to provide a curricular emphasis for students who may have a specific educational or career goal in mind. Such a goal could include post-secondary education (e.g., the study of human nutrition at the university level), training in a particular field, general education in a specific area of study, or direct entry into employment. Through collaborative planning, teachers can build mutually reinforcing relationships among courses within a particular package in the school. Further explanation on school-related packages may be found in section 5.9 of OSIS.

The term community-related package identifies a set of courses planned jointly by the school and the community to provide students with a curricular emphasis related to the major economic base of the community. For example, in a heavy tourist area, a community-related package may include courses in English, French, business, and food and nutrition sciences. Any package having a concentration in food and nutrition sciences should introduce students to skills and knowledge associated with a range of possible occupations. Such a package can be supportive for entry to the workplace either following graduation from secondary school or after additional study in a post-secondary program. Further information on community-related packages may be found in section 5.10 of OSIS.

## 6.2 Work Experience

Work experience provides a student with a learning opportunity in the workplace, under the supervision of an employer, for a limited period of time without pay. As a component of the student's program, work experience provides opportunities to practice and reinforce the skills and knowledge acquired in school in a real job setting. It also provides students with an orientation to the workplace, as well as opportunities to explore careers through discussions with experienced workers. A student could benefit from working with a nutritionist, for example, for a short period of time in order to understand the nature of this profession.

Work experience is normally limited to one or two weeks in any one school year and should be carefully planned in advance. The activities and objectives of the learning experiences in which the student is to be involved must be discussed before hand by the teacher and the employer or supervisor. Evaluation reports on the student's experience should be prepared by both the employer and the student.

Every precaution must be taken to ensure the safety and protection of students on the job. Safe work stations, special instruction on safe practices, appropriate clothing, and the provision of Workers' Compensation Board coverage are all factors to be considered when out-of-school work experiences are planned. Further information on work experience may be found in section 5.12 of OSIS.

## 6.3 Co-operative education

Co-operative education can be used by boards and schools to link the school with the world of work. It should provide students with realistic expectations of the day-to-day practices and requirements of business and industry. In some cases the out-of-school placement may provide necessary experience that is not readily available in the school. Such placements may include hospitals, nursing homes, food-processing plants, and a food research laboratory.

In all cases, components of the co-operative education mode of delivery shall maintain the integrity of this guideline. Both school officials and employers have a responsibility to monitor each student's progress to ensure that the course objectives are being met. The parameters within which co-operative education can take place are set out in section 5.11 of OSIS.

# FOOD AND NUTRITION SCIENCES

## PART B

## COURSES

# FOOD AND NUTRITION SCIENCES

## PART B

## FOOD & NUTRITION SCIENCES I

### Rationale

This course will help students to understand that food choices are made in the context of fulfillment of needs and wants in a particular social, physical, economic and cultural setting and that the technologies by which food is obtained, processed and marketed influence both availability and choice.

### Objectives

Students will be provided with opportunities to:

- identify food as a basic human need and explain physiological, social, and psychological reasons that motivate people's food choices

- examine dimensions of food choices and preparation from a historical perspective

- investigate how changes in food choices and eating patterns evolved

- identify food taboos, fads and fallacies

- identify how Canadian cuisine has evolved

- identify how technology has affected and will continue to modify the form, variety, quality and quantity of the food available

- investigate science and technology principles used in the operation of food preparation equipment

- identify and investigate the impact of technology on food preparation

### Topics

The content for this course is organized under the following topic headings:

1. Food Choices
2. Food Taboos, Fads, and Fallacies
3. Canadian Cuisine
4. Food Handling and Storage
5. Food Technology
6. Food Preparation Equipment
7. The Food Market

Topic: 1. Food Choices

| Core Objectives | Core Content |
|---|---|
| a) to identify food as a basic human need | - Maslow's hierarchy of needs or similar theories<br>- the universality of human needs<br>- the difference between needs and wants |
| b) to differentiate between physiological, psychological and social reasons for eating | - physiological reasons: sustenance, growth, repair, maintenance, vitality, well-being, the sensory appeal of foods (taste, aroma, texture, appearance, sound)<br>- psychological reasons: relief of tension, to counteract boredom or anger, for security, for oral satisfaction<br>- social and cultural reasons: celebration, friendship, intimacy, transfer of culture, family rituals and traditions, as a symbol of hospitality, as a means of getting to know another person, food may be |

| Core Objectives | Core Content |
|---|---|
| | used as a status symbol, food for convenience |
| c) to examine food choices from a historical perspective | - problems found in urban areas in the past: sanitation, crowding, poverty, distance from food sources<br>- food choices in rural areas is the past<br>- general economic concerns about food in the past<br>- origins of foods eaten today |
| d) to identify some of the socio-cultural factors that influence food choices | - factors affecting the availability of food: government policies, the packaging and storage of food, transportation, income levels<br>- factors affecting the acceptability of food: customs (cultural and religious), effects of advertising, time people have available for food purchases and meal preparation, nutrition knowledge |

| Core Objectives | Core Content |
|---|---|
| e) to examine and illustrate the personal significance of the meanings that individuals associate with food | - the feelings of love, intimacy, and acceptance or rejection that individuals develop from infancy in connection with food and eating<br>- the relationship between personal food choices and eating patterns and eating patterns and lifestyles of families<br>- the influence of the media on the formation of attitudes towards food and eating |
| f) to investigate and explain how food habits develop and change | - advances resulting from production technology,<br>- new means of supply and distribution of food<br>- changing economic conditions<br>- the influence of the educational, social and cultural environments<br>- peer influence<br>- personal motivation to change<br>- the influence of role models<br>- the influence of the media |

Topic 1 Optional Content

- variation of food needs throughout the life cycle
- food for survival, as viewed by hunters and gatherers in the past
- food choices in agrarian societies of the past
- the origin of cooking and the agricultural revolution
- the impact of the formation of villages on food choices and patterns, and on the availability of greater varieties of foods
- the impact of the spice trade on food choices and lifestyle: exploration led to colonization, the Industrial Revolution and growth of cities
- the cuisines of ancient civilizations such as Rome, Greece, Egypt
- later contributions and influences of international cuisines (e.g., French, Oriental, Middle Eastern, Caribbean)

Topic: 2. Food Taboos, Fads and Fallacies

| Core Objectives | Core Content |
|---|---|
| a) to investigate the influence of beliefs and socio-historical practices related to food taboos, fads and fallacies | - food attitudes and practices from group to group or person to person (a delicacy to some is considered taboo by others)<br>- the attribution of moral virtue to certain foods<br>- magical beliefs about foods<br>- miracle food remedies |
| b) to identify current taboos fads, fallacies, or advocacies about food | - food attitudes and practices of groups and individuals classified as fads, taboos or fallacies (e.g. a delicacy to some is considered taboo by others)<br>- health food and natural foods in this category<br>- sensationalized media declaration of food taboos or fads (e.g., monosodium glutamate scare, various statements about cholesterol and dietary fats, fad reducing diets focused on one or two foods to either eat or avoid) |

## Topic: 3. Canadian Cuisine

| Core Objectives | Core Content |
|---|---|
| a) to outline the evolution of Canadian cuisine | - the influence of our geography in creating distinctive regional patterns and practices<br>- the contributions of our Native peoples<br>- the influence of immigration |
| b) to identify the effects of sociological changes on Canadian cuisine | - women in the work force, increased affluence for many Canadians, unemployment, and changing forms of families |
| c) to become aware of the effect of the national nutrition status on Canadian cuisine | - the results of the National Nutrition Survey<br>- the increased awareness of the need for sound nutritional practices among most Canadians |

### Topic 3 Optional Content

- the influence of technological advances, improved transportation, increased incidence of labour-saving equipment and the media on eating patterns

- the effect of the time available for shopping and meal preparation today in terms of gender, ethnocultural origins, levels of income, forms of families and whether location is rural or urban.

## Topic 4. Food Handling and Storage

| Core Objectives | Core Content |
|---|---|
| a) to identify and practise safe food-storage and handling techniques | - the effect of technological innovations on hygiene and sanitation |
| | - food poisoning: botulism, salmonella, staphylococcus |
| | - the growth of yeast, molds and bacteria |
| | - the role of packaging and labelling |
| | - storage: dry, cool; the use of shelves, ventilation, temperature, control, product, rotation, refrigeration inventory |
| | - personal cleanliness, tidiness, and health |
| | - dishwashers, pot washing, water hardness, soaps, detergents, sterilizers, cleansers |
| | - garbage: storage and disposal, incinerators, grease traps |
| | - the role of enzymes |
| | - Health Protection and Promotion |

| Core Objectives | Core Content |
|---|---|
| | Act and the Food and Drug Act and their regulations<br>- procedures practised by government laboratories in analysis and control of food standards for foods on the market |

Topic 4. Optional Content

- procedures practised by government laboratories in analysis and control of food standards for foods on the market.

Topic 5. Food Technology

| Core Objectives | Core Content |
|---|---|
| a) to investigate current technology for food preparation | - cooking methods and techniques used<br>- various types of equipment available<br>- applying technology to affect aesthetic quality, taste, and nutrient retention during storage<br>- technological innovations in preparation and service of food for aesthetic appeal (e.g., convenience foods, takeout foods, frozen dinners) |
| b) to identify the uses of technology in food presentation and storage | - new preservation techniques in the freezing, drying, canning, and smoking of foods<br>- the use of refrigeration, freezing and preservation techniques<br>- technology applied to the packaging of foods<br>- the role of additives in |

| Core Objectives | Core Content |
|---|---|
| | packaging and preserving and enrichment of foods<br>- beverages<br>- fast foods (restaurant chains)<br>- health foods<br>- imitation foods (e.g., coffee creamer, cream topping)<br>- food mixes (e.g., cakes, pudding)<br>- food spreads (e.g., cheese, meats) |
| c) to examine some particular modern food technologies | - synthetic foods and analogues (new product development)<br>- computers and food preparation: menu planning, inventory control, nutrient analysis<br>- agricultural technology (e.g., artificial ripening) |

Topic 5 Optional Content

- the historical impact of technological changes in food preparation (e.g., from chopping by hand to the use of the food processor; from porridge to Pablum to instant cereals); fast foods

- factors involved in the establishment of a fast food outlet or restaurant

## Topic: 6. Food Preparation Equipment

| Core Objectives | Core Content |
|---|---|
| a) to investigate and demonstrate the use and operation of food preparation equipment | - classification of equipment<br>- advantages and disadvantages of some with similar functions<br>- changes in procedures when different equipment is used (e.g., French knife, electric knife; mixers, beaters)<br>- materials used for equipment (e.g., ceramics: Pyrex, Pyroceram)<br>- function and operation of particular equipment examples (e.g., pasta machines, food processors, electric frypans, microwave ovens, convection ovens, barbecues, insulated storage trays, disposable utensils) |
| b) to identify factors to consider in choosing equipment | - the design and ergonomics of home and commercial kitchens relative to equipment<br>- performance standards<br>- value for money spent<br>- range of products available |

### Topic 6. Optional Content

- investigation of various food preparation environments that improve the efficiency of food preparation

- investigation and comparison of energy-efficient appliances and food equipment

## Topic 7: The Food Market

| Core Objectives | Core Content |
|---|---|
| a) to investigate factors affecting the wholesale and retail food market | - the impact of climate on availability and quality of food<br>- the effect of natural disaster (e.g., a tornado or a flood) on the market |
| b) to identify procedures involved with the retail food market | - function of large centers of supply e.g., Food Terminal in Toronto<br>- methods of purchasing: contract, telephone, market, direct supplier, salespeople, use of computers, bulk purchases<br>- planning to take advantage of sales |
| c) to investigate aspects of packaging as a market place feature | - legal requirements of the packaging of food products and labelling techniques<br>- functions of packaging<br>- sealing methods in packaging<br>- the convenience aspect of package |

| Core Objectives | Core Content |
|---|---|
|  | design (e.g., size, kind of package, stability)<br>- the influence of package design on food cost and safety |

Topic 7 Optional Content

- packaging and labelling legislation
- various types of packaging
- tests for appropriateness of various package materials for different foods
- use of package to sell a product
- entrepreneurial opportunities in the food market

Teaching Suggestions

The following are sample suggestions for activities that can be used in order to realize some of the objectives and content. The number and letter refer to the topic and objective to which each is related:

1(a) Students can discuss what would happen in their own lives if their basic physiological needs were not met (e.g., the effect that this would have on the satisfaction of their higher-level needs, as listed in Maslow's hierarchy). The discussion should include a consideration of the extent to which people in different countries or regions (or even within student's own community) may have to expend all of their energy to meet their basic need for food, clean water, housing, and so on. Students could then investigate the degree to which these fundamental needs are being met for a specific group within the population. They can also research the living conditions of elderly persons in the local community or those in developing countries so that they develop an awareness and understanding of the concept of "basic needs".

1(b) In small groups, students can list several foods that have a symbolic meaning for them and identify the symbolism attached to these foods. Each group can then choose one of the foods listed, prepare it, and set up a display that includes an explanation for their choice to be shared with the other groups. (Students could choose to prepare and describe foods that they consider to have a particularly sensory appeal.)

1(c) Students can prepare a banquet that features a typical selection of the foods available and served in a particular historical era. By researching the types of food eaten in the era, students will appreciate that the foods available at that time may have been limited or different from the foods available today. (The opportunity to cook outdoors over a campfire may stimulate a discussion about the problems faced by early hunters and gatherers in preparing their food.)

1(d) Students can investigate the history of a specific food (e.g., a vegetable, a fruit, cheese) in order to develop an understanding of food traditions and practices and how they have influenced colonization and trade.

1(e) Students can be involved in brainstorming sessions in order to identify specific factors that have altered their own eating patterns. Around a picture of an infant or a child, the teacher can write words that suggest an attitude towards, an association with, or an emotional use of food and then elicit student responses to such questions as "How do we learn to use food as a comfort or a crutch?"

1(f) Students can conduct a survey of three generations of the same family in order to determine how food patterns have changed and why.

2(a) Student can discuss some of the cultural and personal beliefs related to the nutritional value of certain foods (e.g., that fish is brain food). They can then trace the origins of the beliefs and examine nutrition information for evidence to support such apparently unfounded myths or fallacies about food.

Teaching Strategies for the three levels of difficulty

The course must be adapted to suit the level at which the student has chosen to take it. The following is an example of adaptations for the section identified as: Topic 1. Food Choices, Objective (b)

Basic Level In small groups, students can list reasons why people eat; students can then categorize their responses under the three headings Physical Needs, Social Needs, and Emotional Needs, and the class as a whole can discuss the reasons that are most important to them. The following are some of the questions that can be explored: Do you eat because you are bored, to relieve tension, or to avoid talking in a social situation? Why do adolescents often appear unconcerned about their health and well-being in terms of adequate nutrition? Student evaluation in this activity can be based on their degree of involvement in providing responses, which can be rated according to a scale with which students have been previously familiarized.

Students can list every food that they ate on the previous day. Using a recognized food guide, they can plan (with the teacher's help), well-balanced group of meals or foods for one day. The resulting plan can then be compared with student's personal diet records. The consideration of appearance, energy requirements, and so on should be stressed to encourage students to change food habits that could be improved.

Students can plan, prepare, and serve foods in ways that reflect the various concepts that they have learned (e.g., food for celebration, food for friendship, food for pure enjoyment). This activity can be evaluated according to criteria that emphasize co-operation, group dynamics, and enthusiasm for the activity rather than mastery of food-preparation techniques.

General level. Students can brainstorm to discover reasons "why we eat" and record their responses. The teacher should then identify and categorize the reasons, and students can discuss the importance of each reason at this stage of their lives.

Students can record their food intake for three days to determine which reasons for eating have the greatest influence on their food choices. Students' food-intake sheets can be analyzed by the teacher and students.

Students can plan a food-preparation activity that identifies a celebration (e.g., a cake to celebrate a child's birthday) or fulfills psychological needs (e.g., hot chocolate and cookies to provide comfort) a traditional family dish for a cultural celebration, or the gift of food as an expression of friendship. The evaluation of this activity should concentrate on students' level of co-operation with each other, group dynamics, and students' organizational skills and enthusiasm for the task rather than on a mastery of the food-preparation techniques required for the foods they have selected.

Advanced level. Students can brainstorm to list reasons "why we eat" and categorize their responses under the headings Physiological Needs, Psychological Needs, and Social Needs. They should discuss how some responses may fit more that one category (e.g., status symbol may reflect both psychological and social needs; eating to obtain a fine figure or a muscular body may reflect both physiological and psychological needs). Students can then examine the relative importance of each reason for eating through each stage of the life cycle or across different cultures. For example, for many, survival is the key; within affluent groups, the psychological and social reasons become more important.

In order to appreciate the sensory appeal of food, students can conduct experiments with colour (e.g., blue gelatin or blue applesauce) to illustrate that "we eat with our eyes". They can also conduct experiments to illustrate the complexity of our tasting mechanism by determining the flavour of candy while blindfolded or while holding their noses.

The symbolic nature of food can be discussed in some detail. The symbolism of foods in a variety of cultures and religions can be discussed (e.g., Why is the egg used a symbol at Easter for some groups? Why is unleavened bread a symbol of Passover). Students can also research the origins of some symbolic foods (e.g., the Thanksgiving turkey, the foods used in the West Coast Indian potlatch). They can then design bulletin board or posters to illustrate the physiological, psychological, and social reasons whey we eat.

Students can plan a food-preparation activity as an application of their learnings (see the description outlined for the general level above). They could also conduct media analyses of food trends and of food advertising (e.g., its appeal to our need for status or sese of belonging).

In addition to the teacher's evaluation of the food-activity planning sheets, research assignments, food experiments, and so on, students working at the advanced level of difficulty should be encouraged to evaluate their own work and that of their peers. Opportunities for students to design evaluation devices that they might use for self-and peer evaluation should be provided.

At the basic and general levels of difficulty student evaluation in general should be based on such regular activities as:

- assessment of the student effort and involvement
- assessment based on checking of homework and class assignments and experiential activities
- regular, though short in duration for the basic level, testing of daily or weekly learnings.
- assessment of group and individual work.
- ongoing student-teacher progress consultations
- teacher observations of student growth and development in the application of the learning process to each learning experience.
- practice in giving and receiving peer evaluation.

At the advanced level of difficulty student evaluation in general should be based on such regular activities as:

- assessment of student competency in identifying and using pertinent information.

- assessment of student competency in applying thinking skills to the learning experience and forming conclusions when that is required.

- assessment of student competency in applying analytical and evaluation skills to issue and problem-solving learning experiences.

- assessment of student competency in giving and receiving peer evaluation.

- assessment of individual student growth and development in the application of the process of learning to each learning experience as observed by the teacher-assessment of group and individual work.

- ongoing student-teacher progress consultations.

## FOOD & NUTRITION SCIENCES II

### Rationale

This course will help students to investigate scientific principles related to food and nutrition and to develop an understanding of the application of this scientific basis to food preparation and choices for food and nutrition. Also, this course deals with the investigation of food and nutrition issues from socio-historical, religious, cultural, geographical, technological, economical and psychological perspectives.

### Objectives

Students will be provided with opportunities to:

- understand the scientific basis from which the study of food and nutrition has evolved.

- identify and investigate the chemical, physical and nutritional properties of foods, which together form the basis for food classification, handling and processing.

- examine nutritional contributions of foods and to assess the nutritional adequacy of food patterns.

- identify eating patterns in Canada and to examine the factors that have influenced them in the past and the present, and will probably exert an influence in the future.

- develop critical-thinking skills in order to make judgments about food and nutrition issues related both to their own lives, and to community and global issues.

- develop an awareness of ethical considerations and responsibilities regarding food and nutrition issues.

- undertake investigative fieldwork in selected food and nutrition issue areas.

## FOOD & NUTRITION SCIENCES II

### Topics

1. Development of Food and Nutrition Sciences
2. Nutritional Classification of Foods
3. Food Intake and Physiological Well Being
4. Food Choices and Nutrition
5. Nutrition Related Diseases
6. Nutrition and Lifestyle
7. Food Supply and Safety

### Topic 1. Development of Food and Nutrition

| Core Objectives | Core Content |
|---|---|
| a) trace the background and evolution of the science of nutrition | - scientists and their discoveries (e.g., Pasteur)<br>- discoveries of nutrients<br>- application of scientific principles to food and crop production<br>- formation of dietary standards<br>- representative current research in nutrition (e.g., effects of high and low levels of cholesterol) |

### Topic 1. Optional Content

- results of a wide range of current nutrition studies.

## Topic 2. Nutritional Classification of Foods

| Core Objectives | Core Content |
|---|---|
| a) to investigate the chemical and physical properties of milk and its products and to identify the nutritional implications for those foods in the human diet | - sources of milk, processing of milk and milk products<br>- pasteurization and homogenization<br>- types of milk (e.g., skim)<br>- cheeses: types and their characteristics, uses; the use of moulds in making and preserving cheeses<br>- yogurt: types, uses; the use of bacteria in making yogurt<br>- cream: characteristics of types, uses<br>- ice cream and ice cream products<br>- nutrient composition<br>- food value<br>- retention of nutrients during preparation and preservation |
| b) to investigate the chemical and physical properties of meat, fish, poultry and | - sources of these protein foods<br>- nutrient composition<br>- ways of using and serving foods |

| Core Objectives | Core Content |
|---|---|
| meat alternatives and to identify nutritional implications for those foods in the human diet | - classification and grading<br>- retention of nutrients in preparation and preservation<br>- storage and preservation (e.g., smoking and salting techniques)<br>- a comparison of food value as indicated by the protein supplied<br>- effects of processing and cooking techniques |
| c) to investigate the physical and chemical properties of cereal grain and products and to identify the nutritional implications of these foods for the human diet | - sources of cereal grains<br>- types of grains and their properties<br>- nutrient composition<br>- enrichment and fortification<br>- retention of nutrients in preparation and preservation<br>- ways of using cereal products<br>- effects of acid and alkaline leaveners in cereal products<br>- food value of various cereal products |
| d) to investigate the | - structural composition of a |

| Core Objectives | Core Content |
|---|---|
| chemical and physical properties of fruits and vegetables and to identify the nutritional implications of these foods in the human diet | variety of fruits and vegetables<br>- nutrient composition<br>- cultivation, harvesting and processing techniques<br>- ways of using fruits and vegetables<br>- retention of nutrients in preparation and preservation (e.g., the use of sugar, salt and acid)<br>- food value of fruits and vegetables and their products |
| e) to investigate the chemical and physical properties of fat and oil products and to identify the nutritional implications of these foods in the human diet | - sources and characteristics of different types<br>- nutrient composition<br>- manufacturing processes overview<br>- the storage and care of fats and oils<br>- uses in preparation of foods (e.g., emulsifiers, tenderizers, flavouring agents)<br>- nutrient retention in preparation and preservation |

| Core Objectives | Core Content |
|---|---|
|  | - food value of fat and oil products |
| f) to investigate the chemical and physical properties of sugars and to identify the nutritional implications of them in the human diet | - sources (e.g., cane; beet), structure, and composition of sugar and sweeteners<br>- characteristics of different types of sugar (e.g., powdered, syrup)<br>- manufacturing process overview<br>- nutrient composition<br>- retention of nutrients in preparation and preservation<br>- food value<br>- sugar products<br>- artificial sweeteners |

Topic 2 Optional Content

- details of the processes by which different milk, meat, cereal and fat products are made
- government regulations and marketing board influences on the forms and structures of types of foods available
- factors affecting costs (e.g., processing, cooking

techniques, storage techniques) of adequate nutritional value for one's money

## Topic 3. Food Intake and Physical Well-Being

| Core Objectives | Core Content |
|---|---|
| a) to investigate the relationship between food eaten, human physiology and well-being | - food sources and functions of nutrients<br>- nutrient requirements and variations with lifestyles and stages of the life cycle (e.g., infants, children, the elderly, pregnant women).<br>- nutrient needs for body sustenance, growth, repair and maintenance<br>- food as a source of fuel for the body's needs<br>- the effects of physical activity on food-energy requirements<br>- the chemical components of nutrients<br>- the nature and action of enzymes<br>- digestion, absorption and metabolism<br>- Canadian nutrient recommendations<br>- the effects of processing (e.g., rolling, puffing, canning, |

| Core Objectives | Core Content |
|---|---|
| | extruding) on the nutrient value of foods<br>- the excessive ingestion of some foods and food substances |
| b) to investigate the occurrence of additives in foods and how they affect physiological well-being | - types and functions of food additives<br>- the implications of food affect additives for health<br>- government testing of food addition and reasons for it<br>- the analysis of additives in personal food consumption |

Topic 3 Optional Content

- additives from an historical perspective
- the role of additives in food packaging

## Topic 4. Food Choices and Nutrition

| Core Objectives | Core Content |
|---|---|
| a) to identify and explore factors that influence food choices in Canada | - patterns of meals according to number in a day, amount and types of foods<br>- menu examples according to foods available, traditions, customs, regions, preferences<br>- the effects of the stage in the life cycle and different lifestyles on menus and meal patterns<br>- the influences of different nutritional guides (e.g., Canada's Food Guide, Native People's Food Guide, vegetarian food guides, diabetic exchange guide, various international food guides)<br>- planning of menus to suit various needs; occasions and meal patterns; factors to consider: food requirements on a daily/weekly basis, time schedules (for preparation and eating), food substitutes that could be considered, recipe collection for |

| Core Objectives | Core Content |
|---|---|
|  | choices, and foods for special dietary needs<br>- menu computerization for the retail market |

Topic 4 Optional Content

- menu planning for different types of restaurants, commercial dining rooms or institutions (e.g., a school, a senior citizens residence)
- nutrient requirements and food recommendations for different athletic pursuits
- different food patterns for different types of vegetarianism

## Topic 5. Nutrition Related Diseases

| Core Objectives | Core Content |
|---|---|
| a) to address issues related to a variety of nutrition related diseases (e.g., cardiovascular diseases, obesity, anorexia, bulimia, undernutrition, osteoporosis, cancer, diabetes, food allergies, tooth decay, periodontal diseases, fetal alcohol syndrome, alcoholism | - from the social science perspective consider the following:<br>. role of the family and social environments in the etiology of diseases<br>. the effectiveness of different counselling approaches for weight-loss groups as a supplement or a hinderance to recommended nutrition practices<br>. nutrition related diseases and demographic differences (e.g. the incidence of cardiovascular disease among the Japanese in Japan as opposed to North Americans of Japanese descent)<br>. psychological bases: stress, proactive vs. reactive living, influence of family backgrounds on health habits and personal values |

| Core Objectives | Core Content |
|---|---|
|  | . historical and present food-consumption patterns: the cultural context of habits<br>. social and political influences on the incidence of hunger in various places, locally and throughout the world<br>- from the biological science perspective consider the following:<br>. body changes and their impact on overall health<br>. the biochemistry of different diseases in varying degrees of complexity depending on the information available (e.g., the effects of excessive, amount of sugar, alcohol)<br>. shifting perspectives about nutrient requirements (e.g., calcium requirements for women in light of the new knowledge about osteoporosis) |

| Core Objectives | Core Content |
|---|---|
| | . genetic predisposition |
| | . other risk areas (e.g., sedentary living, smoking, drinking, out-of-control stress) |
| | . recommended diets and their rationales |
| | . the significance of the emerging field of psychoneuro-immunology (the effects of the mind on the physical body) |
| | . the influence of changing food habits on body health |
| | - from the technological science perspective consider the following: |
| | . food-product marketing |
| | . fluoridation of water supplies and toothpastes |
| | . changes in available food products (e.g., convenience foods, fast foods, energy-reduced foods) |
| | . food labelling: ingredient and nutrient listing |

| Core Objectives | Core Content |
|---|---|
|  | . confounding factors in world hunger (e.g., food distribution, soil erosion) |

Topic 6. Nutrition and Lifestyle

| Core Objectives | Core Content |
|---|---|
| a) to explore the relationship between nutrition and lifestyle for the following issues:<br>. vitamin supplements, nutrition needs during the life cycle, poverty, fitness, vegetarianism, product promotion, health-food eating, space nutrition, stress and nutritional well-being, fast foods | - from the social science perspective consider the following:<br>. the promotion of health and well-being as a sociological phenomenon: changes in the meaning of health during the twentieth century<br>. the politics of marketing food from the perspective of different age groups<br>. food from the perspective of cultural groups<br>. the influence of family members, the media, peers, and the educational system<br>. the development of fast foods in the post-industrial era<br>. media ethics: freedoms, responsibilities, challenges<br><br>- from the biological science perspective consider the following: |

| Core Objectives | Core Content |
|---|---|
| | . the relationship of infant needs to bottled milk and breast milk |
| | . ways of life and nutritional health (e.g., increased fitness, vegetarianism, ethno-cultural practices, fast foods) |
| | . special needs for different activities (e.g., competitive sports) |
| | . the rationale for varying nutrient needs during different stages of the life cycle |
| | . vitamin and mineral supplements |
| | . calcium loss as a result of lack of activity (e.g., people confined to bed) |
| | . the body's response to fast-food eating ("grazing") |
| | - from the technological science perspective consider the following: |
| | . history of food for infants and young children |

| Core Objectives | Core Content |
|---|---|
| | . tailoring of food products to lifestyles |
| | . meeting the needs of the developing countries |
| | . development food products for different stages of the life cycle: packaging size, taste, convenience, selection |
| | . the technological challenges of "space" nutrition |
| | . the effect of government regulations |
| | . the future of fast food |

Topic 7. Food Supply and Safety

| Core Objectives | Core Content |
|---|---|
| a) to investigate some of the factors that affect food supply and safety (e.g., pesticides, water supply, agribusiness, food additives, food labelling, organic foods marketing boards, microwaves, air pollution, irradiation) | - from the social science perspective consider the following:<br>. the historical evolution of government regulations in response to a shifting social, political, and economic environment and the health awareness of consumers<br>. the politics of pesticides and other forms of pollution (decisions that affect our food supply)<br>. the politics of marketing boards (whom do they protect?)<br>. the interrelationship of food habits and food supply<br><br>- from the biological science perspective consider the following:<br>. the impact of the environment on food supply and on the nutritional health of food (i.e., the |

| Core Objectives | Core Content |
|---|---|
| | destruction and unavailability of nutrients in foods)<br>- food-supply risks: cancer, food poisoning, over-and undernutrition<br>- effects of food-supply changes (products and nutrient composition) on population health<br>- the biochemical risks of food pesticides food additives, irradiation, chemical fertilizers, and the use of hormones in animal feed.<br><br>- from the technological science perspective consider the following:<br>. challenges in eliminating food and water pollution<br>. the relative importance of improved sanitary practices in the evolution of nutritional health<br>. the quality of food products in relation to different methods of preparation (e.g., microwave, conventional baking) |

| Core Objectives | Core Content |
|---|---|
| | . organic vs. traditional farming<br>. the regulation of products in health-food stores<br>. roles and responsibilities of marketing boards (e.g., Milk Marketing and Egg Marketing boards)<br>. new ways of growing food<br>. the role of government inspectors in food-processing plants |

Teaching Suggestions

The following are sample suggestions for learning activities that can be used in order to realize some of the objectives and content. The number and letter refer to the topic and objective to which each is related:

2(c) Laboratory work can focus on the analysis of the chemical reactions that occur during the preparation of various types of food. For example, students can study the fermentation process of yeast by growing yeast moulds in test tubes and by making bread.

2(a) to (f) Visits to farms, local markets, food-production plants, and stores can be of value in involving students in first hand investigation of food production and processing.

4(a) As well as doing menu planning, students can prepare meals using the various food guides available.

2(a) to (f) Laboratory testing for properties within the various food groups can range from the testing of the foaming abilities of egg whites, the air retention of creams and oils, and the pigment retention of vegetables to the testing for the presence of alkalines and acids.

4(a) Students can assess the nutrient adequacy of their food-intake patterns for a specified time period, using computer software or a print source of nutrient-value tables.

It is suggested that Topics 5, 6 and 7 of the course be taught using the issue approach. A detailed description of the approach is warranted and, therefore, follows.

## The Issue Approach

Before examining the specific issues, students must understand what an issue is. In terms of this guideline, an issue is a problem, question, or controversy for which at least two perspectives can be supported. The consideration of an issue involves the skills of analysis, synthesis, and evaluation, as well as the formulation of a viewpoint and possibly some course of action. This process underlines the interpretive component of knowledge. The intention is to familiarize students with the complexity and current status of food and nutrition issues while simultaneously sharpening their self-awareness and decision-making skills.

The issue approach is recommended because it facilitates self-directed, investigative field work and critical thinking, as well as making students personally familiar with the ideas being explored. It integrates ideas from both the daily and scientific press, while using students' personal experiences to illuminate the reality of the issues.

The second step in creating the framework for inquiry is the identification of the range of issues that are currently prominent in the popular and scientific press. This provides an opportunity to focus on students' personal experiences that are related to the issues. Through this general examination, the multifaceted nature of the issues will become more apparent.

Three basic questions should be addressed in approaching any issue:

- What is the issue of controversy?
- What are the different points of view, and why?
- What is the most balanced perspective?

Group Learning - The success of this approach may be enhanced if students are permitted to work and learn together in small groups of two to five people. In this approach to learning it is essential that students have a clear understanding at the outset of an assignment of the tasks to be undertaken and their purpose. The teacher should take on the role of a resource person and facilitator. In the long run, students who are guided well in the ways to approach their group learning will obtain and integrate essential information; they will benefit from sharing both their scientific and personal knowledge with their peers and from continuously testing and correcting their perceptions. This approach to learning is also likely to relate more directly to students' needs and interests.

## Teaching and Evaluation Strategies at the Three Levels of Difficulty

Organizing the Class as a Seminar - one way of managing group learning is to organize the entire issue approach (and class) in a seminar format. Groups of three to five students could be responsible for investigating one or two issues in depth. Each student might also undertake the study of one other issue of personal interest as an individual assignment or as part of a learning contract. Such assignments can be shared with other group members at a convenient time.

Group tasks of varying degrees of complexity could be used to determine students individual and collective interests. At the basic level of difficulty, the teacher can give students index cards that each contain an issue to be explored. Students can sort the cards into three piles according to high, low, or no interest. They could than rank-order only the high-interest cards. To obtain the overall interest of the group, students can share their top three individual interests and choose for group study the issue that arises most frequently. Students working at the general level of difficulty could brainstorm to generate the issues, which could then be written on cards and sorted in the ways already suggested. Students at the advanced level of difficulty could undertake a more complex problem-generating or brainstorming process: They could begin by articulating issues that are relevant to the community and then issues of personal or individual interest. They could then use index cards to sort the issues as suggested above, choosing a community issue for a group assignment and a personal issue for individual exploration.

The expectations of students working at the three levels of difficulty could be differentiated by the extensiveness of the research undertaken and the requirements for presentations and documentation. At the basic level, students would confine their data exploration to teacher, school, and personal and community resources. Students working at the general and advanced levels would be encouraged to extend their exploration to include community resources and professional newsletters and journals. Students at the advanced level might also be expected to keep reflective field notes (as do anthropologists), which could be submitted for evaluation purposes.

Student presentations could be evaluated according to content and style. Students working at the basic level would be expected to meet the minimum requirements of the demonstration of at least two different viewpoints on an issue and the drawing of a clear conclusion. Their written documentation might include a collage or a compendium of information that illustrates their arguments. Students working at the general level would be required to defend their point of view and rationale through library and field research. They might be expected to produce a short position paper. Students working at the advanced level would be expected to provide a more critical appraisal of the prevailing viewpoints, as well as a strong defence of other positions. Their documentation might include a position paper, their field notes, and a reflective summary of their experiences.

Audio-visual presentations could be used as an alternative means of demonstrating the results of individual assignments. Students could simultaneously exhibit their assignment, taking turns at discussing their group's work with other students and asking questions of the other groups. The presentation could be evaluated according to criteria similar to those required for group documents, and short essay examinations could be designed for the whole class to highlight and further explore the viewpoints raised by the presentations.

Organizing the Class According to Issues This approach could also be carried out through an in-depth exploration of a small selection of issues by all class members. This issue taken from Topic 6 objective (a): "Fast Foods -- How do They Affect Our Health?" has been selected to illustrate how this approach can be used to differentiate learning for each of the three levels of difficulty.

Basic level Working individually or in pairs, students can use food models and other visuals to illustrate their interpretation of fast foods and the relationship of such foods to personal and community health. Students' presentations can be assigned grades that reflect their achievement according to specified criteria.

To stimulate further discussion, the teacher could show the class how to assess the nutritional value of fast foods through an analysis of one student's collection of fast foods. The objectives of the discussion would be to have students:

- distinguish high and low nutritious foods;
- note the prevalence of high and low nutritious and fast foods in their diets;
- assess the potential effects of their fast-food intake patterns on their personal health.

Students could be required to complete individual nutrient analyses of their fast-food intake for evaluation.

After clarifying the nature of fast foods, students could participate in a "Fast-Food Day" by bringing to class samples of foods. This would provide students with an opportunity to identify cultural, social, and life-cycle differences in the use and availability of fast foods. Groups of students could also create nutritious fast-food menus and invite other groups to taste their meals. The evaluation of this activity could be based on the following:

- the extent to which students participate in bringing samples of fast foods to class;
- a written three-page summary of each group's insights about the cultural, social, and life-cycle differences in the use and availability of fast foods (The evaluation criteria would be the same as those used for a short essay;
- the grading of the fast-food menus of each student group on the basis of nutritional balance and aesthetic value.

As a supplement to this activity, groups of students could be assigned the task of visiting large supermarkets to observe and comment on the range of fast-food products available. They could extend their observations through required readings from textbooks and/or articles. Students could be encouraged to explain why fast-food products exist and what factors might change the nature of these products in the future. Students observations about the processing, packaging, and preparation of fast-food products could be documented in an essay or an audiotape or videotape recording, either of which could be used to evaluate student achievement.

General level Students can make presentations that demonstrate their definitions of fast foods and the types of fast foods that they include in their food choices. Students' presentations can be assigned grades that reflect their accuracy and creativity.

The following questions could then be used to stimulate a classroom discussion related to fast foods:

- What are your favorite fast foods? Why?
- What proportion of your favorite fast foods are nutritious?
- Why do you eat fast foods?
- What aspects of your social and cultural history have contributed towards your use of fast foods?
- Are fast foods necessarily "junk" foods?

Students can record what they learned about fast foods through the food-collage activity and the subsequent discussion in a two-to three-page written reflection. Evaluation criteria would focus on how clearly students articulated their learning.

A more in-depth analysis of the use of fast foods and their nutrient composition can be obtained by asking students to keep personal food records for three days. Students' records should contain descriptions of the fast foods eaten, the time of day they were consumed, the food groups to which they belong, and the calories and major nutrients that the fast foods contribute to their diets. In class, students can analyse their records together in small groups. Each group could then summarize its results on a flip chart, noting the main features shared by the individual records. Each group can be prepared to share the results of its investigation with the other groups in the class. Students individual and group analyses of their fast-food eating patterns could be evaluated for their accuracy and depth of observation. The quality of their group work (a group rating) could also be assessed by the group as a whole, by other class members, and finally by the teacher.

Students could be required to interview an adult from each major phase of the life cycle to note the changing meaning and form of fast foods over the past fifty years. As part of the field work, students should be required to keep notes of their experiences and to present summaries of their findings. The field notes and summaries could be graded using similar criteria as those used to evaluate essays. Students could also be invited to assign themselves a grade and to provide an appropriate rationale for their choices according to criteria that were jointly predetermined by themselves and the teacher. The final grade should be provided by the teacher and should indicate the similarities and differences between the student and teacher assessments.

Advanced level Students can be organized into investigative teams for the purpose of examining the pros and cons of fast foods. They could be required to share their views through debates, role plays, case studies, stories, and videotaped presentations. Students work can be evaluated for content and style. The persuasiveness of their arguments would be a critical factor in the evaluation process. A brief report describing how they arrived at their conclusions could be assessed based on similar criteria as those used to evaluate essays and reports.

Students cannot only keep and analyse their own three-day fast-food records (as described in the activity for students working at the general level), but also those of two individuals whose lifestyles differ markedly from their own. Their challenge would be to discern similarities and differences in the records and provide a well-reasoned explanation of their findings.

Finally, students working at the advanced level could complete a project that explores the social, cultural, and technological history and future of fast foods. Students would be expected to demonstrate their awareness of the changing nature of fast foods as a focus of society moves from industry to information. The project could be evaluated according to pre-established criteria. Students could also be asked to provide their own assessments of their projects, which the teacher could use a reference points for rationalizing his/her evaluations and for helping students to improve their work.